1. Abstract

Background – Several studies have shown the positive effect of cardiac rehabilitation (CR) for cardiac patients. The optimal training program is still under debate and results of different studies remain controversial. The High-Intensity Interval Training Early After Myocardial Infarction (HIIT EARLY) study is an ongoing study conducted at the University Hospital Berne, which examines the effect of a 12-week CR using either high-intensity interval training (HIIT) or moderate-intensity continuous exercise training (MICE) on cardiac function and cardiorespiratory fitness. The present study is a substudy of the HIIT EARLY study analyzing preliminary data with regard to the effect of the two training interventions on exercise capacity and on the progression of training intensity over the intervention period.

Methods – The HIIT EARLY study is a prospective, randomized, controlled study. Thirty-five male patients with a myocardial infarction (STEMI) within four weeks prior to study inclusion were included. After a 3-week run-in phase they were randomized to MICE (n=19) or HIIT group (n=16). Before the run-in period, after three weeks at baseline and after conclusion of the study intervention, patients completed a cardiopulmonary exercise test (CPET). Differences in CPET and psychological parameters from baseline to conclusion visit were evaluated over time as well as between groups. The two training modalities were also compared with regard to progression of training intensity, which was derived from load and heart rate monitoring of individual training sessions.

Results – There was an similar increase in VO_2/kg of 18% and 11% in the MICE and HIIT group, respectively (p-value=0.06 for between group difference). The maximum workload increased in both groups by approximately 23 Watts. There was no significant difference between groups in cumulative heart beats and cumulative Watt hours of all individual training sessions. Mean BORG over all training sessions was 15 for the HIIT and 12.5 for the MICE group. While BORG and maximum HR of individual training sessions remained stable over time, load relative to patients' individual maximal load increased over the intervention period in the MICE group only.

Conclusion – In our preliminary study data both training modalities achieved similar improvements in VO_{2peak}. In contrast, there was no chronotropic response in neither group. The training sessions were of identical duration, were isocaloric, and were both adjusted on a weekly basis to reach maximal individual training loads for the respective length of bouts. Individual training adjustments by BORG-scale can easily be implemented into the clinical setting. Inter-individual variance of achieved mean HR was high in both groups (range 66%-130% in HIIT, 60%-130% in MICE), and therefore poorly suited for individual training adjustment.